



Mauritius Examinations Syndicate

# PSAC 2020-2021

## Modular Grade 5 Science

Subject Code: P141/1

Examiners' Report

April 2022

# SCIENCE

(Subject Code No. 141/1)

## INTRODUCTION

With the disruptions in the school calendar caused by the COVID-19 pandemic, the PSAC Modular Grade 5 Science Assessment 2020, initially scheduled for October 2020, was only held in March 2021.

However, as in the previous years, the assessment was based on the learning outcomes at Grade 5 found in the *Science Teaching and Learning Syllabus Grades 3 to 6 (MIE 2015)*.

In line with the weighting ascribed to the three Assessment Objectives defined in the *Annual Programme for the Primary School Achievement Certificate (PSAC) Assessment 2020*, about 40 % of the question paper assessed candidates' knowledge and understanding of the Science concepts taught at this level. Another 40 % of the paper assessed candidates' ability to apply their knowledge in varied contexts and 20 % of the paper assessed the extent to which candidates had developed scientific inquiry skills.

The purpose of this report is to provide information about the performance of candidates on the paper, the difficulties they met, common mistakes they made, and the misconceptions identified. It is hoped that this information will help to improve the learning and performance of candidates in the future.

### Key messages:

- It is important to encourage pupils to read questions till the end carefully. Candidates tend to react too quickly to given stimuli (pictures, diagrams) that are similar to those proposed in past examinations or which are found in their books. In some cases, given answers did not correspond to the questions asked.
- There is a need to consolidate pupils' understanding of scientific vocabulary and terms and to highlight the difference between terms such as *exotic*, *endemic*, *extinct*, *rare* and *endangered*. Of equal importance is to encourage pupils to spell these scientific terms correctly.
- In line with building pupils' capacity to respond to open-ended questions (application and inquiry based), pupils should be encouraged to write simple, short sentences in communicating their ideas.
- Opportunities to carry out hands-on activities as early as possible should also be encouraged as these would better equip pupils to respond to inquiry-based as well as application questions in the question paper.

## GENERAL COMMENTS

The mean mark scored by candidates in the paper was 23.79 out of 50.

Candidates generally demonstrated a good grasp of the knowledge of science concepts and processes taught at this level. Knowledge and recall questions were well-tackled in general.

A persistent problem faced by candidates was their ability to communicate in writing. This sometimes made it difficult to gauge their level of understanding. Candidates showed a tendency to write long and unpunctuated sentences (for example in **Qu. 2(a)**, **Qu. 3(c)**, **Qu. 5(a)(iv)**). In so doing, they sometimes contradicted themselves within the same sentence. Encouraging pupils to write simple, short sentences instead may not only help to alleviate this shortcoming but can also train pupils to sustain their line of thinking when writing their answers.

As highlighted in previous reports, questions which aimed at measuring the extent to which candidates had developed application and inquiry skills were found to be relatively less straightforward. Given that around 60 % of the question paper assesses application and inquiry-skills, it is important to keep building pupils' capacity to respond to these types of questions in the classroom.

## SPECIFIC COMMENTS

### QUESTION 1 (5 marks)

This question comprised five multiple-choice questions mainly assessing candidates' knowledge with understanding.

Candidates fared well in this question on the whole.

**Table 1** summarises the performance of candidates on the individual items within the question.

**Table 1**

Item Number	Key	% correct
(a)	<b>D</b>	75.9
(b)	<b>C</b>	86.8
(c)	<b>C</b>	88.9
(d)	<b>B</b>	73.0
(e)	<b>C</b>	76.5

**Item (a)**      *Which one of the following animals lives in a **web**?*

This item was well-answered in general. Candidates had to recall which insect from the given list (the bee, the butterfly, the fly and the spider) lives in a web. It assessed the learning outcome: '*List the different habitats of animals*', of the syllabus.

**Item (b)** Which one of the following food items is a **root** vegetable?

This item was accessible to the majority of candidates. The carrots, Option **C**, was the key. A few candidates chose Broccoli, Option **B**, possibly because of its resemblance to a root system.

**Item (c)** What is the **form** of energy that a swimming fish has?

This was a straightforward question. The large proportion of candidates who successfully answered this question suggest a firm understanding of the different forms of energy that exist.

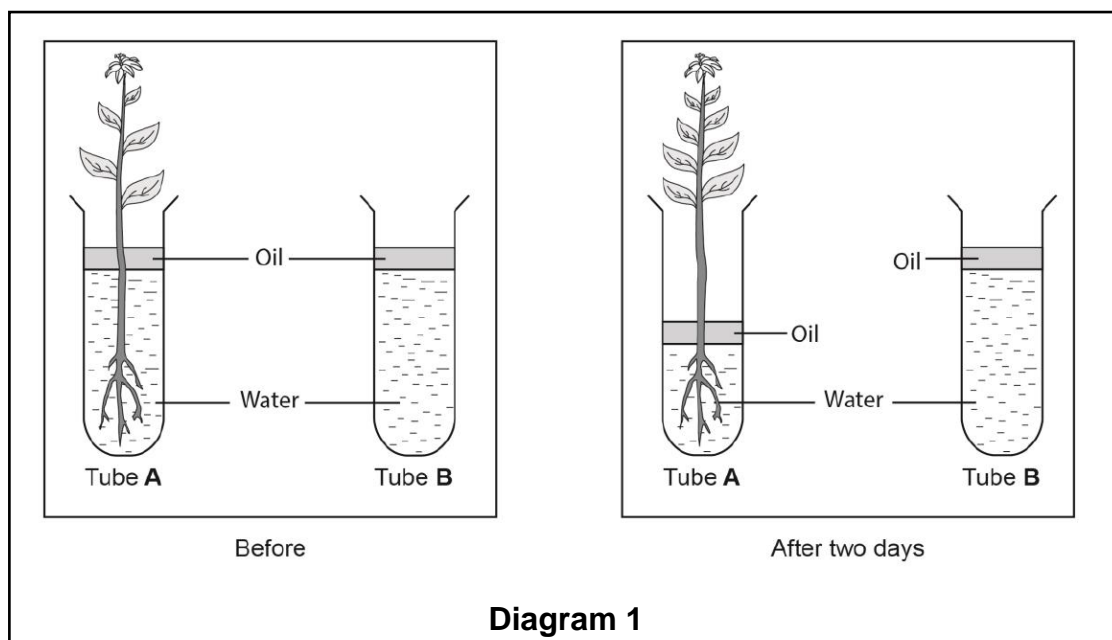
**Item (d)** What is the function of a **switch** in an electric circuit?

Performance on this item was satisfactory. Both, options **A** (It protects against electric shocks) and **C** (It conducts electricity in the circuit), were chosen by those who didn't find the correct answer. The functions of the different components of an electric circuit may need to be highlighted further to clear any confusion pupils might still have.

**Item (e)** Tina carries out an experiment to investigate one of the functions of the root using the set-up shown in **Diagram 1**.

After two days, she observes that the level of water in Tube **A** has decreased.

What can Tina conclude **from her experiment**?



This was an inquiry-based question which, by nature, necessarily presented a rather heavy context and a relatively high language load. While this type of question is generally regarded

as challenging, it was pleasing to note that the large majority of candidates were successful at answering this item. The diagram given helped candidates understand the context.

## QUESTION 2 (10 marks)

This question was based on the topic of '*The Simple Electric Circuit*'. Performance in this question was relatively good. More than half of the candidates were able to score a total of 10 marks in this question.

Candidates' performance in part question 2 (b) in particular was good. In part (b) (i), they readily recognised conductors and insulators from the list of objects provided. In part (b) (ii), many were able to identify the correct terms 'insulators' or 'non-conductors'. However, the terms themselves were often misspelt. As pointed out earlier, encouraging proper spelling of key scientific terms and vocabulary may help address this shortcoming.

Some difficulties which candidates encountered were as follows:

1. In part (a) (i), the majority of candidates correctly identified the electric component **P** (a cell) but sometimes referred to it as '*pil*'. Some candidates seemed unsure and gave two answers: '*a cell or battery*'. A good number of candidates also mistook the cell for a battery. It is worth pointing out the difference between a dry cell and a battery in class.
2. Part (a) (ii) revealed a number of misconceptions. Imprecise answers such as '*It [the cell] contains electricity*', '*it stores electricity*', '*It helps the bulb to light up*', sometimes made it difficult to gauge candidates' comprehension of the function of the cell. A cell contains or stores chemical energy. Its function in the context given was to convert the stored chemical energy into electrical energy to light up the bulb.
3. Candidates did not read part question (c) carefully enough. As a result, instead of giving two examples of unsafe uses of electricity that were shown in **Diagram 4** in part (c) (i), they gave two precautions which were the answers to the subsequent part question (c) (ii).

As observed in a number of questions, both in the modular Grade 5 and Grade 6 papers, the expectations of the examiner from key words used in questions are often misunderstood. In this case, candidates mistook **uses** for **precautions**. In other instances, candidates confused between giving a **reason** and writing a **definition**. In the past, candidates often gave a reason to a question which required them to give a **consequence**. It is important to draw the attention of pupils to the different requirements of a given question based on the specific word or key word used in the question.

### QUESTION 3 (8 marks)

#### Part (a)

Question 3(a) assessed candidates' ability to apply their knowledge and understanding of

- 1) the functions of a stem
- 2) the characteristics of leaves

in the given context.

Various issues were noted in the answers of candidates regarding this part question:

- In part (a)(i), many candidates gave one function of the stem that was unrelated to the diagram provided. Expected correct answers included:
  - *The stem holds the fruits*
  - *The stem holds the plant upright*

It is possible that candidates did not pay sufficient attention to the question asked before giving a response. Another possibility is that the function of the stem was learnt in such a mechanical way that candidates cannot tell apart which specific function was relevant in the given context. Requiring pupils to apply their knowledge of the functions of the different parts of a plant in varying contexts would help them develop a deeper understanding of these functions.

- A good number of candidates provided telescoping answers in parts (a)(i) and (a)(ii). This means that they gave the same function of the stem in both parts (a)(i) and (a)(ii) but expressed in different ways.
- Some of the answers candidates gave were vague and imprecise such as
  - *\*The stem take the water*
  - *\*The stem carries water*
- A non-negligible number of candidates mistook the function of the stem for the function of the roots:
  - *\*The stem absorb water from the soil*
  - *\*The stem carries water from the soil to the plant*
  - *\*The stem hold the tree to the ground*

#### Part (b)

Question 3(b) required candidates to

- 1) identify the part of the jackfruit plant where food is manufactured.
- 2) explain why food is manufactured in this part of the plant.

Performance in this question was fair. A considerable number of candidates found the correct answer 'leaves' in part (b)(i). However, in part (b)(ii), only a handful of them were able to explain

that leaves have pores that allow for gas exchange during photosynthesis or because they contain chlorophyll to trap sunlight. The degree to which candidates were able to express their ideas greatly varied. I

There is value in offering learning opportunities to pupils to differentiate between correct, imprecise and incorrect answers to clarify misconceptions and to build pupils' confidence in responding to such types of questions in the future.

### **Parts (c) and (d)**

These part questions focused on the sub-topic of 'soil erosion'. More specifically, it assessed the following learning outcomes of the syllabus:

- *state what is soil erosion*
- *state the causes of soil erosion*
- *list measures to prevent soil erosion*

A large number of candidates answered these part questions successfully.

Part (c) was straightforward and candidates demonstrated a good understanding of what soil erosion is and how it affects the environment. The main difficulty encountered was in writing simple, clear and accurate sentences. A handful of candidates mistook soil erosion for beach erosion.

Part (d) assessed candidates' inquiry skills requiring them to *present reasoned explanations* based on the diagram provided. The majority of candidates successfully explained why the piece of land shown would be affected by soil erosion and what could be done to prevent soil erosion in that case. However, a few candidates gave measures of preventing soil erosion that were not related to the context.

## **QUESTION 4 (10 marks)**

### **Part (a)**

This question assessed candidates' knowledge and understanding of the states of water.

Very few candidates were able to score full marks in this question. It was difficult for candidates to differentiate between melting, freezing and condensation with confidence in many cases. This suggests that they had a limited understanding of these processes. The teaching of these key concepts in Science has to be reinforced.

Quite many also used the terms 'ice', 'water' and 'water vapour' instead of 'solid', 'liquid' and 'gas' respectively to indicate a state of water. While candidates were rewarded for the underlying knowledge they showed, it is important that the usage of proper scientific terms be encouraged in class.

## Part (b)

This question was based on a bar chart.

Parts (b)(i) and (b)(ii) were well-done in general and this suggests a good mastery of simple data analysis.

In part (b)(iii), candidates had to infer why the electric water heater was the least popular type of water heaters used based on their knowledge of safe uses of electricity or the fact that electric water heaters are expensive to operate. A good number of candidates struggled with this part question. Answers given were often too vague or unclear such as *\*It uses electricity*.

In contrast, part (b) (iv) was fairly well-answered in general. Many knew why solar water heaters are more efficient in summer than in winter. Yet again, expressing answers in writing proved a challenge. Common wrong answers often arose from a misconception that there is no sunlight during winter as shown by the following:

- *\*There is no sunlight in winter*
- *\*Because in summer has sunlight in winter has not sunlight*

Few were able to answer parts (b) (v) and (b) (vi) correctly. The word 'other' was often overlooked.

## QUESTION 5 (10 marks)

### Part (a)

This question assessed candidates' knowledge and understanding of key scientific terms related to the topic on Animals namely *habitat*, *exotic*, *endemic*, *extinct*, and *endangered*. Performance in this question revealed that these terms were not familiar to some candidates or were not well understood.

Few candidates scored full marks in this part question. While the majority of candidates rightly identified the Kestrel as an 'endemic' bird in part (a) (i), very few could find the correct answer 'habitat' to part (a) (ii). Common wrong answers were:

- *\*Nature reserve*
- *\*Round island*
- *\*Ile aux Aigrettes*

The term 'endangered', which was the answer to part (a) (iii), also seemed unfamiliar to a very large number of candidates.

Many incorrect answers to part (a) (iv) referred to the extinction of the dodo (e.g., *\*Because the dodo has extinct*).



In part (a)(v), candidates had to give two measures taken by the Mauritian Government to protect the Kestrel bird from disappearing. Marks were lost in this part question as a result of providing telescoping answers.

### **Part (b)**

Part (b) assessed whether candidates had achieved the learning outcome 'Investigate the features of animals which enable them to live in a particular habitat' of the syllabus.

Performance in part (b) was very encouraging given the unfamiliar features of the chameleon presented.

The majority of candidates correctly identified the features of the chameleon that enabled it to grip onto branches and to catch its prey.

A large number of candidates rightly recognised camouflage as an important characteristic that helps the chameleon to either protect itself from predators or to catch its prey.

Quite many were also able to relate the features of the chameleon to its inability to live in a lake.

The main problem faced by candidates in responding to Question 5(b) was the difficulty to express their understanding in writing.

## **QUESTION 6 (7 marks)**

### **Part (a)**

Question 6(a) assessed candidates' knowledge and understanding of evaporation and its uses in daily life.

Performance in this part question was relatively poor.

In part (a) (i), quite a good number of candidates could not define evaporation correctly.

In part (a) (ii), where candidates were asked to give two ways in which evaporation can be useful to humans, a large number of candidates lost marks for expressing the same idea in two different ways.

### **Part (b)**

Question 6(b) was based on an experiment investigating the effect of temperature on the rate of evaporation.

Few candidates were able to answer Qu. 6 (b) (i) correctly. The question related to the design of a scientific experiment. It sought to assess pupils' understanding of the importance of keeping certain variables constant when carrying out an experiment, a notion which has not

been mastered by most. It is important to highlight that very often candidates gave stereotypical or general answers that were not related to the context given such as:

- to allow a comparison to be made
- to be able to draw a conclusion.

Pupils should be discouraged from giving such types of answers which would apply in any similar context.

Parts (b) (i) and (b) (ii) were well-answered by a good number of candidates. This indicates candidates' ability to use and interpret data. However, the fact that options to choose from were offered in these part questions should not be overlooked.

Performance in part (b) (iv) was somewhat better than in part (b) (i) but remained low in general.

One way of building pupils' confidence in responding to inquiry-based question such as in Qu. 6 (b), is to provide them with concrete, hands-on activities to experience. To develop a sound understanding of how to design an experiment, they have to be able to see or to infer the effect of changing the variables in real situations. Then only will they be able to respond to inquiry-based questions confidently.